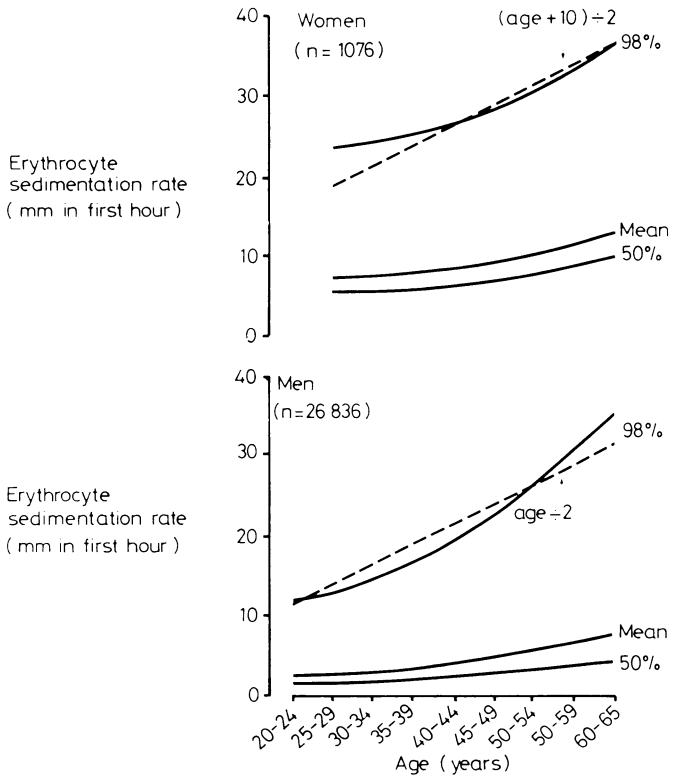
SHORT REPORTS

Simple rule for calculating normal erythrocyte sedimentation rate

Measurement of the erythrocyte sedimentation rate is a commonly performed blood test, so it might be expected that the reference range would have been well established. Several surveys[1-3] suggest that the upper limit of normal in a person aged under 50 may be as high as 15-20 mm in the first hour in men and 25-30 mm in the first hour in women, whereas a recent authoritative review[4] recommended, on the basis of results "derived from several publications," values of 10 and 12 mm in the first hour respectively. Even so, the haematology departments at 10 London teaching hospitals quote the reference ranges as only 0-5 and 0-7 mm in the first hour in men and women respectively, following a standard textbook.[5] We set out to clarify the upper limit of the normal range on the basis of a wide survey.

Subjects, methods, and results

The erythrocyte sedimentation rate was measured by the Westergren method[4] in 27 912 adults (26 836 men and 1076 non-pregnant women) aged 20-65 as part of a routine health screening. None of the subjects was anaemic. Results, expressed to the nearest mm in the first hour, were stored on computer and subsequently analysed. A series of curves of erythrocyte sedimentation rate versus age (in blocks of five years) was constructed separately for men and women; these are shown in the figure, with maximum values for 50% (the median) and 98% of the population, and the mean values.



Erythrocyte sedimentation rates in men and women, with mean values and maximum values for 50% and 98% of the population. Broken lines are given by formulae and approximate to upper limits of normal.

Comment

The data for men came from a normal population 10 times the size of that in any previous study, and confirm other observations[1-3] that the erythrocyte sedimentation rate rises with age. Although only 1076 women were studied, the results in these women were broadly similar to those in the men but with higher values at each age. Possibly a few of these apparently healthy men and women had occult disease that might have contributed to some of the high values, but this is unlikely to have influenced the results materially.

The 50% and 98% levels show that the results were distributed with considerable skewness,[3] and this is the reason for the difference between the mean and median curves. Statistics that assume a normal distribution[1 2 4] are thus misleading, as are the popularly quoted normal ranges of 0-5 mm in the first hour in men and 0-7 mm in the first hour in women.[5] Upper limits of the normal range such as those of Lewis[4] (10 and 12 mm in the first hour in men and women respectively aged under 50, and 14 and 20 mm in the first hour in men and women respectively aged over 60) and of others[1] are more accurate but hard to remember. It would seem reasonable to define the upper limit of the normal range as that value above which less than 2% of the normal population lies. On the basis of our results we propose the following formulae for calculating the maximum normal erythrocyte sedimentation rate at a given age: in men, age in years ÷ 2; in women, (age in years + 10) ÷ 2. When these calculated values are plotted against age (the broken, straight lines in the figure) the results give a good approximation to the 98% curves. These formulae are both realistic and easy to remember.

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Acebutolol-induced hypersensitivity pneumonitis

Episodes of bronchoconstriction induced by beta-blocking agents in patients with asthma or chronic bronchitis are well known.[1] To our knowledge side effects with the features of hypersensitivity pneumonitis have not been reported. We describe a case in which hypersensitivity pneumonitis appeared to be related to administration of acebutolol.

Case report

A 69 year old man with coronary heart disease was treated with acebutolol (200 mg daily) for six months; an *x*-ray film taken one year earlier had been normal. At the end of the six months' treatment a routine *x*-ray film showed bilateral pulmonary infiltrates; physical examination was normal, and a tuberculin skin test negative. There were no symptoms of cardiac failure (normal heart rate, with neither dyspnoea nor cardiac enlargement). Tests of respiratory function yielded normal values except for the carbon monoxide pulmonary diffusing capacity, which was low (transfer coefficient 0·92 mmol/min/kPa/l; 3·3 ml/min/mm Hg/l). Serum activity of angiotensin-converting enzyme was normal; and bronchial, salivary gland, and hepatic biopsy specimens showed no abnormality. In the bronchoalveolar lavage fluid the proportions of lymphocytes, macrophages, and polymorphonuclear leucocytes were respectively 83%, 13%, and 4%.

Acebutolol was withdrawn for 54 days, after which a chest *x*-ray film was normal and the diffusing capacity still low; the cell differential in bronchoalveolar lavage fluid showed 46% lymphocytes, 46% macrophages, and 8% polymorphonuclear leucocytes; the OKT_4^+:OKT_8^+ ratio was 0·16.

Thirty-seven days after acebutolol treatment was resumed, with the